

CTIA

Building The Wireless Future™
Cellular Telecommunications & Internet Association

September 24, 2003

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
12th Street Lobby, TW-A325
Washington, D.C. 20554

**Re: *Ex Parte* Presentation
 WT Docket No. 02-353**

Dear Ms. Dortch:

On September 24, 2003, the Cellular Telecommunications & Internet Association ("CTIA"), represented by Diane Cornell, Vice President for Regulatory Policy at CTIA, Steve Sharkey, Director, Spectrum and Standards Strategy, Motorola and Neeti Tandon, AT&T Wireless Services, Inc, met with Bryan Tramont, Chief of Staff for Chairman Powell, and Sheryl Wilkerson, Legal Advisor for Chairman Powell. The parties discussed issues in the Advanced Wireless Services proceeding, specifically the attached presentation.

CTIA representatives emphasized in the meeting that the service rules should provide for paired spectrum, and that the 1710-1755 MHz band should be designated mobile transmit. They noted that NTIA, representing U.S. Government users, had likewise supported this band being designated as a mobile transmit band to facilitate sharing with incumbent Government uses, and had objected to base station use of the band. CTIA also indicated that any deployment of spectrum for unpaired TDD operations in this band would represent a very inefficient use of spectrum, and should not be sanctioned. As the Commission's own Spectrum Policy Task Force suggested, spectrum efficiency would be furthered by grouping like services and separating incompatible services. The attached outline details additional reasons why allowing unpaired TDD operations in this spectrum would be an unwise approach both from the perspective of the U.S. Government users in the 1710-1755 MHz band, and the customers of potential bidders for spectrum in this band, who would be deprived of the advanced services they hoped to enjoy when this spectrum is deployed for commercial offerings.



Pursuant to Section 1.1206 of the Commission's Rules, this letter is being electronically filed with your office. If you have any questions concerning this submission, please contact the undersigned.

Sincerely,

Diane Cornell

Diane Cornell

cc: Bryan Tramont
Sheryl Wilkerson



Unpaired Spectrum Should Not be Provided in the
1710-1755/2110-2155 MHz Band

▪ **TDD operations will result in inefficient use of spectrum**

An ITU report concludes that a 5-10 MHz guardband between TDD and FDD operations may not be sufficient to prevent interference, depending on the scenario studied.¹ If even 5 MHz of spectrum were made available for TDD operation in each of the 1710-1755 MHz and 2110-2155 MHz bands, and 10 MHz of guardband is necessary on either side of the TDD use, a total of 40 MHz would be wasted on guardband spectrum. That would leave only 40 MHz out of a total 90 MHz for FDD use. These guardbands are necessary to protect both the TDD operations and the FDD operations.

▪ **Allowing TDD technologies will result in significant interference absent significant guardbands or physical separation distances**

There is an extensive record in this proceeding demonstrating that it is not feasible to operate TDD systems adjacent to FDD systems absent large guard bands or geographic separation. For example:

“[A]llocation of unpaired spectrum in the AWS bands would be difficult and would raise interference concerns. Any unpaired use of spectrum necessarily will require a guardband of spectrum between it and any adjacent channel paired spectrum user. Because only 90 MHz of spectrum has been allocated for AWS, and CTIA anticipates explosive demand for AWS services, CTIA does not support unpaired spectrum in the 1710-1755/2110-2155 MHz band at this time.” CTIA comments at pages 4-5.

“This proceeding, when complete, will provide two 45 MHz blocks of spectrum to be paired for mobile service ... In the instant proceeding, the Commission seeks comment on allowing both mobile and base station operations in the 1710-1755 MHz band. However, the NTIA Viability Assessment considered only low-powered mobile operations in the band, in consonance with the parameter supplied by the Commission for IMT-2000 mobile systems... Accordingly, NTIA strongly urges the Commission to prohibit base stations in the 1710-1755 MHz band.” NTIA comments at pages 2,3,4.

“Any allocation of unpaired spectrum would severely restrict the amount of paired spectrum that is available. Moreover, if the Commission were to assign unpaired spectrum in the AWS bands, guard bands would be required between the paired and unpaired spectrum blocks” Motorola comments at 13.

“The Commission should not offer unpaired blocks, or even a combination of paired and unpaired blocks, regardless of whether bidders will have the opportunity to aggregate licenses at auction.... Creating unpaired bands would undermine the Commission’s ability

¹ Draft New Report ITU-R M2030 “Coexistence between IMT-2000 TDD and FDD Radio Interface Technologies within the Frequency Range 2500-2690 MHz Operating in Adjacent Bands and in the Same Geographical Area.”



to achieve its spectrum management goals, particularly promoting the most efficient spectrum use. AT&T Wireless appreciates the Commission's commitment to technical flexibility, including the use of time division duplex ("TDD") technologies, but it is concerned about the severe interference TDD causes to frequency division duplex ("FDD") operations in adjacent bands. Just as Chairman Powell recently noted with regard to co-band satellite and terrestrial operations, the mobile nature of the services being provided makes sharing between independent parties using different technologies far less feasible. Since cdma2000 and W-CDMA technologies employ an FDD transmission mode, authorizing TDD operation in the AWS spectrum would require the creation of large guard bands and the adoption of stringent power limitations. Thus, rather than further the Commission's goals of flexible and efficient spectrum use, licensing unpaired blocks for TDD purposes would impede the speedy deployment of advanced wireless telecommunications services." AT&T comments at pages 7-8.

"Even with the introduction of tighter RF filtering requirements, interference caused by TDD and FDD co-existence would be severe. The studies regarding TDD and FDD co-existence are either still ongoing or show a need to introduce large guardbands between TDD and FDD to mitigate interference." Nokia comments at 1-2.

"...AWS licensees will likely employ bandwidth-intensive functions, including high-speed data transfer and internet access, and will offer multimedia applications, such as full-motion video...such high bandwidth services will require spectrum licenses that are paired" Verizon Wireless comments at page 10.

▪ **There is no record to support TDD and FDD coexistence**

There is no record to support coexistence of TDD with FDD absent significant guardbands or physical separation. While the TDD Coalition supported unpaired use of this spectrum in its reply comments, they failed to provide any technical analysis to support the assertion that TDD can efficiently coexist with FDD technologies. Instead, the TDD coalition based its assertion on two points: 1) That ITU-R Working Party 8F is *in the process of developing* a new report examining the ability of TDD and FDD technologies to coexist, and 2) If and when interference occurs, Section 27.64 is sufficient to resolve the interference. Both of these points provide no basis for the Commission to assign any spectrum for unpaired use by TDD technologies.

1) *There is no agreement on the ITU working document cited by the TDD Coalition* - The ITU document referred to by the TDD coalition is a *working document towards a preliminary draft new report*. Such a document is in the very early stages of development in the ITU process and no information in the report has been agreed to by any international body. Further, in looking at coexistence, the working document looks at numerous mitigation techniques that could be used to provide greater coexistence. These techniques include collocated antennas, orthogonal polarizations, adaptive antennas, improved filtering, and linearization. The current version of the report is, however, inconclusive as to whether these mitigation techniques are sufficient to resolve interference in the absence of a guardband. In addition, all of these techniques would be extremely burdensome to operators, would restrict innovation and flexibility in how the



spectrum is used and would lead to less efficient use of the spectrum. Further, these techniques are far from proven and there is no assurance that, even if the additional burdens and limits were imposed, interference would not occur.

Specific comments on some of the recommendations under consideration in the ITU working document follow:

Site engineering: Most of the site engineering techniques mentioned are already used by systems to mitigate intersystem interference and will not provide additional protection from TDD interference. The ability to implement site engineering to mitigate interference will also be limited by practical considerations, such as strict zoning laws and space availability, and will increase to cost of systems deployment.

Antenna Down Tilting: Down tilting beyond a certain threshold would result in reduced cell coverage and coverage gaps in the system and is insufficient to ensure isolation.

Adaptive Antennas: The adaptive antenna can bring very high theoretical efficiency in interference mitigation. However, such techniques are often impractical to implement from installation point of view, especially in an urban area. Adaptive antennas can be deployed to isolate hot spot interference problems but to use it for a technology deployment system-wide comes with inherent disadvantages, including high deployment cost, high equipment cost and inconsistent performance.

The relevant document for consideration is the document cited in AT&T's comments, Draft New Report ITU-R M2030 "Coexistence between IMT-2000 TDD and FDD Radio Interface Technologies within the Frequency Range 2500-2690 MHz Operating in Adjacent Bands and in the Same Geographical Area", which concludes that significant interference would severely impact user service levels.

2) Section 27.64 is not a substitute for spectrum management – The TDD Coalition would rely on Section 27.64 to provide protection from interference rather than adopt rules intended to promote a reasonable level of technical compatibility. However, what Part 27.64 actually says is that stations operating in accordance with the rules will be considered to be non-interfering. Only in instances where licensees are not operating in accordance with the rules would they be required to resolve interference, except that for intermodulation interference, or in certain limited circumstances, licensees should "attempt" to resolve interference through undefined technical means or operating arrangements. Otherwise section Part 27.64 merely states that no interference protection is afforded. Even in those limited cases where Part 27.64 says that licensees should try to resolve interference, it is so broad that relying it as the primary means to control interference will lead to significant uncertainty regarding use of the band, extended disruptions to services, and costly and drawn out litigation.

- **Even members of the TDD community recognize that the 1710-1755/2110-2155 MHz band is not a very suitable band for TDD operation**

It its comments Arraycomm, Inc. recognizes that:

"...certain considerations preclude the inclusion of TDD-based services in these bands....If FDD is to be accommodated in this spectrum, FDD block pairs will have to be identified in advance (as opposed, e.g., to having to bid separately on uplink and downlink portions and hope of assembling pairs with the right spacing). A band plan



combining paired and unpaired blocks would be even more complex. In practical terms, there appears to be little point in debating flexible band plans combining FDD and TDD modes of operation.” Arraycomm comments at 2-3.

